

## C L A I M S

1. A packet communication method using a plurality of packet transfer apparatuses which are connected to a network and transfer a lower layer frame containing an encapsulated upper layer packet, at least one frame transfer apparatus which mediates transfer of the lower layer frame between the packet transfer apparatuses through the network, and a network control server which is connected to the packet transfer apparatuses and the frame transfer apparatus and controls a communication route of the lower layer frame in the network by giving an instruction to the packet transfer apparatuses and the frame transfer apparatus, characterized in that

the packet transfer apparatus comprises

an extraction procedure which extracts, from the received lower layer frame, a lower layer address pair including a transmission source address and destination address of a lower layer,

a first registration procedure which registers a sending destination of the received lower layer frame in a first table for each corresponding destination address,

a first counter procedure which counts, for each type of lower layer address pair, a quantity of the lower layer address pair extracted by the extraction procedure, and

27               a first transmission procedure which  
28 transmits, to the frame transfer apparatus, first  
29 information representing the lower layer address pair  
30 counted by the first counter procedure beyond a  
31 predetermined threshold value within a predetermined  
32 time,  
33               the frame transfer apparatus comprises  
34               a second registration procedure which  
35 registers a transfer destination of the received lower  
36 layer frame in a second table for each destination  
37 address contained in the lower layer frame,  
38               a second counter procedure which counts a  
39 quantity of the transferred lower layer frame for each  
40 type of lower layer address pair contained in the first  
41 information received from the packet transfer apparatus,  
42 and  
43               a second transmission procedure which  
44 transmits, to the network control server, second  
45 information about the lower layer address pair counted  
46 by the second counter procedure beyond a predetermined  
47 threshold value within a predetermined time, and  
48               the network control server comprises  
49               a calculation procedure which, upon receiving  
50 the second information, extracts the transmission source  
51 address and destination address from the second  
52 information and executes calculation to optimize the  
53 communication route in the network between the

54 transmission source address and the destination address,  
55 and

56 a change procedure which changes registration  
57 of the sending destination of the lower layer frame  
58 registered in the first table and second table on the  
59 basis of the calculation result.

2. A packet communication method using a  
2 plurality of packet transfer apparatuses which are  
3 connected to a network and transfer a lower layer frame  
4 containing an encapsulated upper layer packet, at least  
5 one frame transfer apparatus which mediates transfer of  
6 the lower layer frame between the packet transfer  
7 apparatuses through the network, and a network control  
8 server which is connected to the packet transfer  
9 apparatuses and the frame transfer apparatus and  
10 controls a communication route of the lower layer frame  
11 in the network by giving an instruction to the packet  
12 transfer apparatuses and the frame transfer apparatus,  
13 characterized in that

14 the packet transfer apparatus comprises  
15 an extraction procedure which extracts, from  
16 the received lower layer frame, a lower layer address  
17 pair including a transmission source address and  
18 destination address of a lower layer,

19 a counter procedure which counts, for each  
20 type of lower layer address pair, a quantity of the  
21 lower layer address pair extracted by the extraction

22 procedure, and

23 a transmission procedure which transmits, to  
24 the frame transfer apparatus, first information  
25 representing the lower layer address pair counted by the  
26 counter procedure beyond a predetermined threshold value  
27 within a predetermined time.

3. A packet communication method according to  
2 claim 2, characterized in that in transmitting the first  
3 information to the frame transfer apparatus, the  
4 transmission procedure transmits information about the  
5 destination address contained in the frame information  
6 and a destination address of an upper layer  
7 corresponding to the destination address to the  
8 transmission source address of the lower layer address  
9 pair contained in the first information.

4. A packet communication method using a  
2 plurality of packet transfer apparatuses which are  
3 connected to a network and transfer a lower layer frame  
4 containing an encapsulated upper layer packet, at least  
5 one frame transfer apparatus which mediates transfer of  
6 the lower layer frame between the packet transfer  
7 apparatuses through the network, and a network control  
8 server which is connected to the packet transfer  
9 apparatuses and the frame transfer apparatus and  
10 controls a communication route of the lower layer frame  
11 in the network by giving an instruction to the packet  
12 transfer apparatuses and the frame transfer apparatus,

13 characterized in that  
14 the frame transfer apparatus comprises  
15 a counter procedure which counts a quantity of  
16 the transferred lower layer frame for each type of lower  
17 layer address pair which is instructed by the packet  
18 transfer apparatus to count, and  
19 a transmission procedure which transmits, to  
20 the network control server, second information  
21 representing the lower layer address pair counted by the  
22 counter procedure beyond a predetermined threshold value  
23 within a predetermined time.

5. A packet communication method according to  
2 claim 4, characterized by further comprising a count  
3 processing procedure which deletes, from the count, an  
4 entry of an arbitrary lower layer address pair whose  
5 count value does not increase in a predetermined time.

6. A packet communication method using a  
2 plurality of packet transfer apparatuses which are  
3 connected to a network and transfer a lower layer frame  
4 containing an encapsulated upper layer packet, at least  
5 one frame transfer apparatus which mediates transfer of  
6 the lower layer frame between the packet transfer  
7 apparatuses through the network, and a network control  
8 server which is connected to the packet transfer  
9 apparatuses and the frame transfer apparatus and  
10 controls a communication route of the lower layer frame  
11 in the network by giving an instruction to the packet

12 transfer apparatuses and the frame transfer apparatus,  
13 characterized in that  
14           the network control server comprises  
15           a calculation procedure which, upon receiving  
16 second information representing an arbitrary  
17 transmission source address and destination address from  
18 the frame transfer apparatus, executes calculation to  
19 optimize the communication route in the network between  
20 the transmission source address and the destination  
21 address, and  
22           a change procedure which issues an instruction  
23 to change a sending destination of the lower layer frame  
24 to the packet transfer apparatus and frame transfer  
25 apparatus included between the transmission source  
26 address and the destination address on the basis of the  
27 calculation result.

7. A packet communication method according to  
2 claim 1, characterized by further comprising  
3           in a connectionless packet transfer network  
4 which is logically build on a connection network  
5 comprising a transmission link having a connection  
6 multiplex transmission function and a connection switch  
7 node having a connection switching function by adding,  
8 as a terminal function unit, a connectionless packet  
9 transfer node serving as the frame transfer apparatus  
10 and a connectionless packet communication terminal  
11 serving as the packet transfer apparatus to the

12 connection network, when connection arrangement is to be  
13 executed in accordance with a traffic band and traffic  
14 priority of the connectionless packet transfer network,  
15           a notification procedure which records  
16 statistical information containing a band and priority  
17 for each flow defined by a pair of the transmission  
18 source address and destination address for the packet  
19 transmitted/received in the connectionless packet  
20 communication terminal and notifies a traffic control  
21 apparatus serving as the network control server of the  
22 recorded statistical information, and  
23           a flow list creation procedure which causes  
24 the traffic control apparatus to create a flow list in  
25 which information containing the transmission source  
26 address, destination address, priority, and band is  
27 registered for each flow, on the basis of the  
28 statistical information sent from the connectionless  
29 packet communication terminal.

8. A packet communication method according to  
2 claim 7, characterized by further comprising

3           a flow list sorting procedure which sorts the  
4 flow list in descending order of priority and sorts  
5 flows with the same priority in descending order of  
6 band, and

7           a connection candidate list creation procedure  
8 which, assuming that a connection is set between a  
9 transmission source connectionless packet communication

10 terminal and a destination connectionless packet  
11 communication terminal of each flow registered in the  
12 sorted flow list, creates a connection candidate list by  
13 assigning a connection candidate for all flows  
14 sequentially from an uppermost flow in the flow list.

9. A packet communication method according to  
2 claim 7, characterized in that the connection candidate  
3 list creation procedure creates the connection candidate  
4 list by assigning not less than one flow having the same  
5 transmission source connectionless packet communication  
6 terminal, the same destination connectionless packet  
7 communication terminal, and the same priority to the  
8 same connection candidate without making a sum of bands  
9 exceed a capacity of the connection candidate and  
10 determining the priority and band of the connection  
11 candidate on the basis of the priority and the sum of  
12 the bands of the assigned flows.

10. A packet communication method according to  
2 claim 8, characterized by further comprising  
3 a connection candidate list sorting procedure  
4 which sorts the connection candidate list in descending  
5 order of priority and sorts connection candidates with  
6 the same priority in descending order of band, and  
7 a reservation procedure which reserves a  
8 connection interface of the connectionless packet  
9 communication terminal for all connection candidates  
10 contained in the sorted connection candidate list

11 sequentially from an uppermost connection candidate in  
12 the sorted connection candidate list.

11. A packet communication method according  
2 to claim 10, characterized by further comprising  
3 a selection procedure which selects, on the  
4 basis of the connection candidate list sorted by the  
5 connection candidate list sorting procedure, a  
6 connection requiring no setting from a connection  
7 solution list in which connections to be set are  
8 registered,  
9 a comparison procedure which sets, as a  
10 connection candidate as a processing target, a  
11 connection candidate for which reservation is possible  
12 in the sorted connection candidate list and compares the  
13 priority and band of the connection candidate as the  
14 processing target with those of the selected connection,  
15 a connection solution list creation/update  
16 procedure which, when the priority and band of the  
17 connection candidate as the processing target are more  
18 than those of the selected connection, excludes the  
19 connection candidate as the processing target from the  
20 connection candidate list and adds the connection  
21 candidate as the processing target to the connection  
22 solution list, and excludes the selected connection from  
23 the connection solution list and adds the selected  
24 connection to the connection candidate list, and  
25 a taboo connection list registration procedure

26 which, when the priority and band of the connection  
27 candidate as the processing target are not more than  
28 those of the selected connection, registers the  
29 connection candidate as the processing target in a taboo  
30 connection list,

31                wherein the comparison procedure sets, of the  
32 connection candidates for which reservation is possible,  
33 an uppermost connection candidate which is not  
34 registered in the taboo connection list as the  
35 connection candidate as the processing target.

12. A packet communication method according  
2 to claim 10, characterized by further comprising

3                a selection procedure which selects, on the  
4 basis of the connection candidate list sorted by the  
5 connection candidate list sorting procedure, a  
6 connection requiring no setting from a connection  
7 solution list in which connections to be set are  
8 registered,

9                a comparison procedure which sets, as a  
10 connection candidate as a processing target, a  
11 connection candidate for which reservation is possible  
12 in the sorted connection candidate list and compares the  
13 priority and band of the connection candidate as the  
14 processing target with those of the selected connection,

15                a connection solution list creation/update  
16 procedure which, when the priority and band of the  
17 connection candidate as the processing target are more

18 than those of the selected connection, excludes the  
19 connection candidate as the processing target from the  
20 connection candidate list and adds the connection  
21 candidate as the processing target to the connection  
22 solution list, and excludes the selected connection from  
23 the connection solution list and adds the selected  
24 connection to the connection candidate list,  
25               a taboo connection list registration procedure  
26 which records the connection candidate as the processing  
27 target in a taboo connection list together with the  
28 current number of times of execution of the comparison  
29 procedure, and  
30               a taboo connection list delete procedure which  
31 deletes, from the taboo connection list, a connection  
32 candidate recorded together with the number of times of  
33 execution which is smaller than the current number of  
34 times of execution of the comparison procedure by not  
35 less than a predetermined number,  
36               wherein the comparison procedure sets, of the  
37 connection candidates for which reservation is possible,  
38 an uppermost connection candidate which is not  
39 registered in the taboo connection list as the  
40 connection candidate as the processing target.

13. A packet communication method according  
2 to claim 11, characterized by further comprising  
3               a route calculation procedure which calculates  
4 a route when the uppermost connection in the connection

5 solution list between the transmission source  
6 connectionless packet communication terminal and the  
7 destination connectionless packet communication  
8 terminal,  
9 a connection setting procedure which, when a  
10 transmission resource necessary for transmitting the  
11 uppermost connection can be ensured in a transmission  
12 link on the calculated route, controls the switching  
13 function of the connection switch node to set the  
14 uppermost connection, controls the transmission function  
15 of the transmission source connectionless packet  
16 communication terminal of the flow to transmit the flow  
17 assigned to the uppermost connection by using the  
18 connection, and excludes the uppermost connection from  
19 the connection solution list, and  
20 a connection solution list delete procedure  
21 which, when the transmission resource cannot be ensured,  
22 excludes the uppermost connection from the connection  
23 solution list and adds the uppermost connection to the  
24 connection candidate list.

14. A packet communication method according  
2 to claim 12, characterized by further comprising  
3 a route calculation procedure which calculates  
4 a route when the uppermost connection in the connection  
5 solution list between the transmission source  
6 connectionless packet communication terminal and the  
7 destination connectionless packet communication

8 terminal,  
9 a connection setting procedure which, when a  
10 transmission resource necessary for transmitting the  
11 uppermost connection can be ensured in a transmission  
12 link on the calculated route, controls the switching  
13 function of the connection switch node to set the  
14 uppermost connection, controls the transmission function  
15 of the transmission source connectionless packet  
16 communication terminal of the flow to transmit the flow  
17 assigned to the uppermost connection by using the  
18 connection, and excludes the uppermost connection from  
19 the connection solution list, and

20 a connection solution list delete procedure  
21 which, when the transmission resource cannot be ensured,  
22 excludes the uppermost connection from the connection  
23 solution list and adds the uppermost connection to the  
24 connection candidate list.

15. A packet communication method according  
2 to claim 13, characterized in that when the connection  
3 solution list is empty, when the connection interface  
4 cannot be reserved for any of the connection candidates  
5 registered in the connection candidate list, or when the  
6 transmission resource cannot be ensured for any of the  
7 connections registered in the connection solution list,  
8 one of a series of procedures including the flow list  
9 sorting procedure, the connection candidate list  
10 creation procedure, the connection candidate list

11 sorting procedure, the reservation procedure, the  
12 selection procedure, the comparison procedure, the  
13 connection solution list creation/update procedure, the  
14 taboo connection list registration procedure, the route  
15 calculation procedure, the connection setting procedure,  
16 and the connection solution list delete procedure and a  
17 series of procedures including the flow list sorting  
18 procedure, the connection candidate list creation  
19 procedure, the connection candidate list sorting  
20 procedure, the reservation procedure, the selection  
21 procedure, the comparison procedure, the connection  
22 solution list creation/update procedure, the taboo  
23 connection list registration procedure, the taboo  
24 connection list delete procedure, the route calculation  
25 procedure, the connection setting procedure, and the  
26 connection solution list delete procedure is ended.

16. A packet communication method according  
2 to claim 14, characterized in that when the connection  
3 solution list is empty, when the connection interface  
4 cannot be reserved for any of the connection candidates  
5 registered in the connection candidate list, or when the  
6 transmission resource cannot be ensured for any of the  
7 connections registered in the connection solution list,  
8 one of a series of procedures including the flow list  
9 sorting procedure, the connection candidate list  
10 creation procedure, the connection candidate list  
11 sorting procedure, the reservation procedure, the

12 selection procedure, the comparison procedure, the  
13 connection solution list creation/update procedure, the  
14 taboo connection list registration procedure, the route  
15 calculation procedure, the connection setting procedure,  
16 and the connection solution list delete procedure and a  
17 series of procedures including the flow list sorting  
18 procedure, the connection candidate list creation  
19 procedure, the connection candidate list sorting  
20 procedure, the reservation procedure, the selection  
21 procedure, the comparison procedure, the connection  
22 solution list creation/update procedure, the taboo  
23 connection list registration procedure, the taboo  
24 connection list delete procedure, the route calculation  
25 procedure, the connection setting procedure, and the  
26 connection solution list delete procedure is ended.

17. A packet communication method according  
2 to claim 7, characterized by further comprising a  
3 notification interval setting procedure which causes the  
4 traffic control apparatus to set a notification interval  
5 of the statistical information for the connectionless  
6 packet communication terminal,  
7 wherein the notification procedure records the  
8 statistical information for each flow for the received  
9 packet at the set notification interval and notifies the  
10 traffic control apparatus of the statistical  
11 information, and  
12 the flow list creation procedure updates the

13 flow list on the basis of the statistical information  
14 sent from the connectionless packet communication  
15 terminal.

18. A packet communication method according  
2 to claim 7, characterized by further comprising a  
3 threshold value setting procedure which causes the  
4 traffic control apparatus to set a threshold value of  
5 the band for each flow for the connectionless packet  
6 communication terminal,  
7 wherein the notification procedure records the  
8 statistical information for each flow for the received  
9 packet, and when the band of the recorded flow exceeds  
10 the set threshold value, notifies the traffic control  
11 apparatus of the statistical information of the flow  
12 whose band exceeds the threshold value, and  
13 the flow list creation procedure updates the  
14 flow list on the basis of the statistical information  
15 sent from the connectionless packet communication  
16 terminal.

19. A packet communication method according  
2 to claim 1, characterized by further comprising  
3 in a connectionless packet transfer network  
4 which is logically build on a connection network  
5 comprising a transmission link having a connection  
6 multiplex transmission function and a connection switch  
7 node having a connection switching function by adding,  
8 as a terminal function unit, a connectionless packet

9 transfer node serving as the frame transfer apparatus  
10 and a connectionless packet communication terminal  
11 serving as the packet transfer apparatus to the  
12 connection network, when communication is to be executed  
13 between the connectionless packet communication  
14 terminals,  
15 a transfer node selection procedure which  
16 selects, as a connection setting target, a  
17 connectionless packet transfer node for which the number  
18 of connection switch nodes arranged between the  
19 connectionless packet transfer node and a destination  
20 connectionless packet communication terminal to receive  
21 a packet is minimum,  
22 a first connection setting procedure which  
23 causes a control apparatus serving as the network  
24 control server to control the connection switch node to  
25 set a first connection between a transmission source  
26 connectionless packet communication terminal to transmit  
27 the packet and the connectionless packet transfer node  
28 as the setting target, and  
29 a second connection setting procedure which  
30 causes the control apparatus to control the connection  
31 switch node to set a second connection between the  
32 connectionless packet transfer node as the setting  
33 target and the destination connectionless packet  
34 communication terminal.

20. A packet communication method according

2 to claim 19, characterized by further comprising  
3 a transmission setting procedure which causes  
4 the control apparatus to control the transmission source  
5 connectionless packet communication terminal to transmit  
6 the packet from the transmission source connectionless  
7 packet communication terminal to the destination  
8 connectionless packet communication terminal by using  
9 the first connection, and  
10 a transfer setting procedure which causes the  
11 control apparatus to control the connectionless packet  
12 transfer node as the setting target to transfer, to the  
13 second connection, the packet from the transmission  
14 source connectionless packet communication terminal to  
15 the destination connectionless packet communication  
16 terminal.

21. A packet communication method according  
2 to claim 1, characterized by further comprising  
3 in a connectionless packet transfer network  
4 which is logically build on a connection network  
5 comprising a transmission link having a connection  
6 multiplex transmission function and a connection switch  
7 node having a connection switching function by adding,  
8 as a terminal function unit, a connectionless packet  
9 transfer node serving as the frame transfer apparatus  
10 and a connectionless packet communication terminal  
11 serving as the packet transfer apparatus to the  
12 connection network, when communication is to be executed

13 between the connectionless packet communication  
14 terminals,  
15           a first transfer node selection procedure  
16 which selects, as a first connection setting target, a  
17 connectionless packet transfer node for which the number  
18 of connection switch nodes arranged between the  
19 connectionless packet transfer node and a transmission  
20 source connectionless packet communication terminal to  
21 transmit a packet is minimum,  
22           a second transfer node selection procedure  
23 which selects, as a second connection setting target, a  
24 connectionless packet transfer node for which the number  
25 of connection switch nodes arranged between the  
26 connectionless packet transfer node and a destination  
27 connectionless packet communication terminal to receive  
28 the packet is minimum,  
29           a first connection setting procedure which  
30 causes a control apparatus serving as the network  
31 control server to control the connection switch node to  
32 set a first connection between the connectionless packet  
33 transfer node as the first setting target and the  
34 connectionless packet transfer node as the second  
35 setting target,  
36           a second connection setting procedure which  
37 causes the control apparatus to control the connection  
38 switch node to set a second connection between the  
39 transmission source connectionless packet communication

40 terminal and the connectionless packet transfer node as  
41 the first setting target, and  
42 a third connection setting procedure which  
43 causes the control apparatus to control the connection  
44 switch node to set a third connection between the  
45 connectionless packet transfer node as the second  
46 setting target and the destination connectionless packet  
47 communication terminal.

22. A packet communication method according  
2 to claim 21, characterized by further comprising  
3 a transmission setting procedure which causes  
4 the control apparatus to control the transmission source  
5 connectionless packet communication terminal to transmit  
6 the packet from the transmission source connectionless  
7 packet communication terminal to the destination  
8 connectionless packet communication terminal by using  
9 the second connection,  
10 a first transfer setting procedure which  
11 causes the control apparatus to control the  
12 connectionless packet transfer node as the first setting  
13 target to transfer, to the first connection, the packet  
14 from the transmission source connectionless packet  
15 communication terminal to the destination connectionless  
16 packet communication terminal, and  
17 a second transfer setting procedure which  
18 causes the control apparatus to control the  
19 connectionless packet transfer node as the second

20 setting target to transfer, to the third connection, the  
21 packet from the transmission source connectionless  
22 packet communication terminal to the destination  
23 connectionless packet communication terminal.

23. A packet communication method according  
2 to claim 1, characterized by further comprising  
3 in a connectionless packet transfer network  
4 which is logically build on a connection network  
5 comprising a transmission link having a connection  
6 multiplex transmission function and a connection switch  
7 node having a connection switching function by adding,  
8 as a terminal function unit, a connectionless packet  
9 transfer node serving as the frame transfer apparatus  
10 and a connectionless packet communication terminal  
11 serving as the packet transfer apparatus to the  
12 connection network, when communication is to be executed  
13 between the connectionless packet communication  
14 terminals,

15 a first transfer node selection procedure  
16 which selects, as a first connection setting target, a  
17 connectionless packet transfer node in a first area to  
18 which a transmission source connectionless packet  
19 communication terminal to transmit a packet belongs,  
20 a second transfer node selection procedure  
21 which selects, as a second connection setting target, a  
22 connectionless packet transfer node in a second area to  
23 which a destination connectionless packet communication

24 terminal to receive the packet belongs,  
25           a third transfer node selection procedure  
26 which selects, as a third connection setting target, a  
27 connectionless packet transfer node for which the number  
28 of connection switch nodes arranged between the  
29 connectionless packet transfer node and the transmission  
30 source connectionless packet communication terminal is  
31 minimum,  
32           a fourth transfer node selection procedure  
33 which selects, as a fourth connection setting target, a  
34 connectionless packet transfer node for which the number  
35 of connection switch nodes arranged between the  
36 connectionless packet transfer node and the destination  
37 connectionless packet communication terminal is minimum,  
38           a first connection setting procedure which  
39 causes a control apparatus serving as the network  
40 control server to control the connection switch node to  
41 set a first connection between the connectionless packet  
42 transfer node as the first setting target and the  
43 connectionless packet transfer node as the second  
44 setting target,  
45           a second connection setting procedure which  
46 causes the control apparatus to control the connection  
47 switch node to set a second connection between the  
48 transmission source connectionless packet communication  
49 terminal and the connectionless packet transfer node as  
50 the third setting target,

51           a third connection setting procedure which  
52 causes the control apparatus to control the connection  
53 switch node to set a third connection between the  
54 connectionless packet transfer node as the third setting  
55 target and the connectionless packet transfer node as  
56 the first setting target,

57           a fourth connection setting procedure which  
58 causes the control apparatus to control the connection  
59 switch node to set a fourth connection between the  
60 connectionless packet transfer node as the fourth  
61 setting target and the destination connectionless packet  
62 communication terminal, and

63           a fifth connection setting procedure which  
64 causes the control apparatus to control the connection  
65 switch node to set a fifth connection between the  
66 connectionless packet transfer node as the second  
67 setting target and the connectionless packet transfer  
68 node as the fourth setting target.

24. A packet communication method according  
2 to claim 23, characterized by further comprising

3           a transmission setting procedure which causes  
4 the control apparatus to control the transmission source  
5 connectionless packet communication terminal to transmit  
6 the packet from the transmission source connectionless  
7 packet communication terminal to the destination  
8 connectionless packet communication terminal by using  
9 the second connection,

10               a first transfer setting procedure which  
11 causes the control apparatus to control the  
12 connectionless packet transfer node as the third setting  
13 target to transfer, to the third connection, the packet  
14 from the transmission source connectionless packet  
15 communication terminal to the destination connectionless  
16 packet communication terminal,

17               a second transfer setting procedure which  
18 causes the control apparatus to control the  
19 connectionless packet transfer node as the first setting  
20 target to transfer, to the first connection, the packet  
21 from the transmission source connectionless packet  
22 communication terminal to the destination connectionless  
23 packet communication terminal,

24               a third transfer setting procedure which  
25 causes the control apparatus to control the  
26 connectionless packet transfer node as the second  
27 setting target to transfer, to the fifth connection, the  
28 packet from the transmission source connectionless  
29 packet communication terminal to the destination  
30 connectionless packet communication terminal, and

31               a fourth transfer setting procedure which  
32 causes the control apparatus to control the  
33 connectionless packet transfer node as the fourth  
34 setting target to transfer, to the fourth connection,  
35 the packet from the transmission source connectionless  
36 packet communication terminal to the destination

37 connectionless packet communication terminal.

25. A packet communication method according  
2 to claim 23, characterized in that the connectionless  
3 packet transfer node as the third setting target and the  
4 connectionless packet transfer node as the first setting  
5 target, which are present in the first area, are  
6 connected through a plurality of connectionless packet  
7 transfer nodes and connections present in the first  
8 area, and the connectionless packet transfer node as the  
9 fourth setting target and the connectionless packet  
10 transfer node as the second setting target, which are  
11 present in the second area, are connected through a  
12 plurality of connectionless packet transfer nodes and  
13 connections present in the second area.

26. A packet communication method according  
2 to claim 19, characterized by further comprising  
3 a notification procedure which records, as  
4 statistical information, a band of each flow defined by  
5 a pair of the transmission source address and  
6 destination address for the packet transmitted/received  
7 in the connectionless packet transfer node and notifies  
8 the control apparatus of the recorded statistical  
9 information, and  
10 a flow list creation procedure which causes  
11 the control apparatus to create a flow list in which  
12 information containing the transmission source address,  
13 destination address, and band is registered for each

14 flow, on the basis of the statistical information sent  
15 from the connectionless packet transfer node,  
16 wherein when a connectionless packet transfer  
17 node for which a sum of bands of pass flows exceeds a  
18 predetermined threshold value is detected by the flow  
19 list in setting the connection, a connection which does  
20 not pass through the connectionless packet transfer node  
21 is set.

27. A packet communication method according  
2 to claim 21, characterized by further comprising  
3 a notification procedure which records, as  
4 statistical information, a band of each flow defined by  
5 a pair of the transmission source address and  
6 destination address for the packet transmitted/received  
7 in the connectionless packet transfer node and notifies  
8 the control apparatus of the recorded statistical  
9 information, and  
10 a flow list creation procedure which causes  
11 the control apparatus to create a flow list in which  
12 information containing the transmission source address,  
13 destination address, and band is registered for each  
14 flow, on the basis of the statistical information sent  
15 from the connectionless packet transfer node,  
16 wherein when a connectionless packet transfer  
17 node for which a sum of bands of pass flows exceeds a  
18 predetermined threshold value is detected by the flow  
19 list in setting the connection, a connection which does

20 not pass through the connectionless packet transfer node  
21 is set.

28. A packet communication method according  
2 to claim 23, characterized by further comprising  
3 a notification procedure which records, as  
4 statistical information, a band of each flow defined by  
5 a pair of the transmission source address and  
6 destination address for the packet transmitted/received  
7 in the connectionless packet transfer node and notifies  
8 the control apparatus of the recorded statistical  
9 information, and  
10 a flow list creation procedure which causes  
11 the control apparatus to create a flow list in which  
12 information containing the transmission source address,  
13 destination address, and band is registered for each  
14 flow, on the basis of the statistical information sent  
15 from the connectionless packet transfer node,  
16 wherein when a connectionless packet transfer  
17 node for which a sum of bands of pass flows exceeds a  
18 predetermined threshold value is detected by the flow  
19 list in setting the connection, a connection which does  
20 not pass through the connectionless packet transfer node  
21 is set.